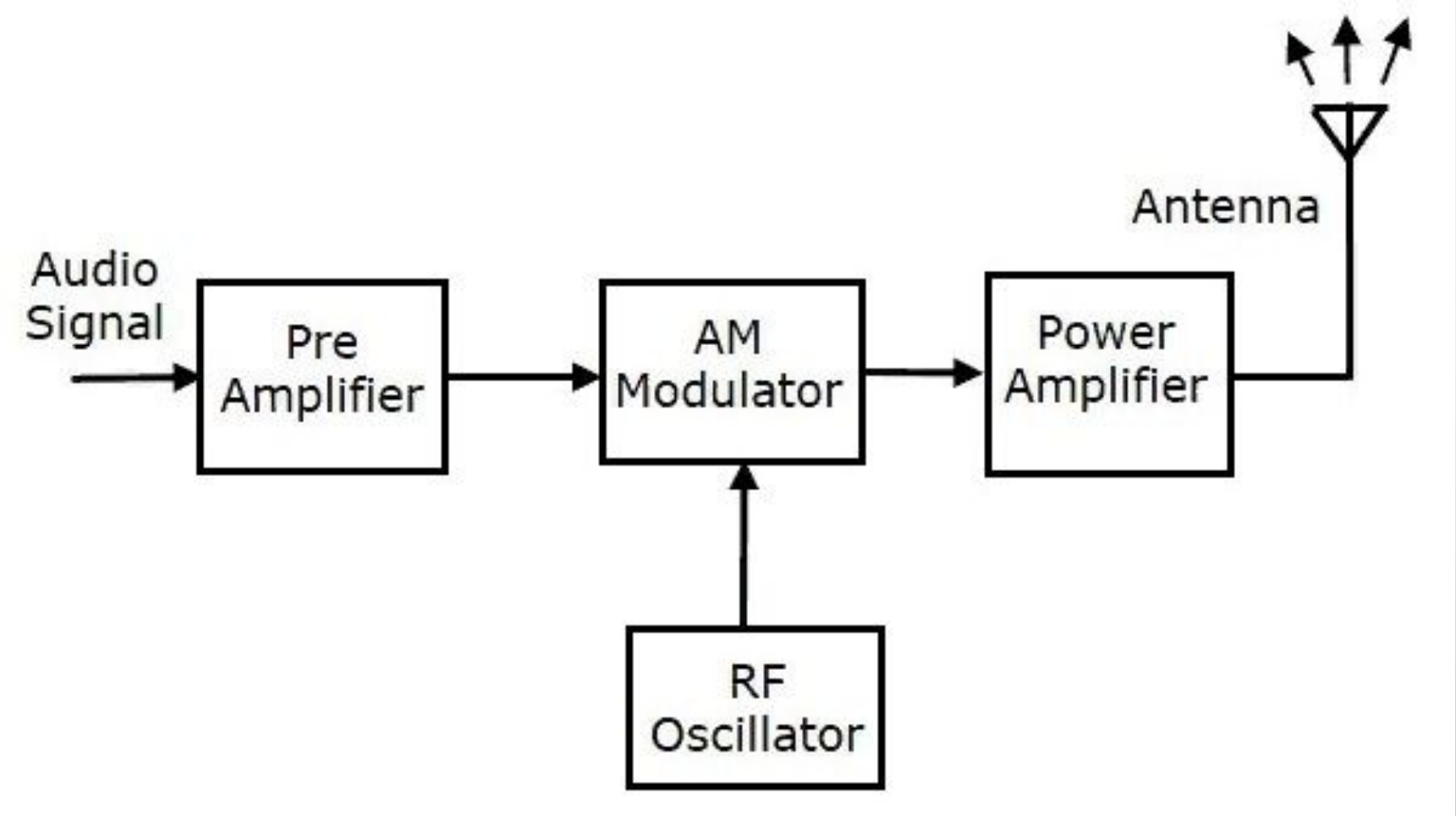
Transmitters and receivers

A simple radio system

To travel – распространяться
transmitting range – дальность передачи
a receiver – приемник
a transmitter – передатчик
a high-frequency oscillator – высокочастотный генератор колебаний
an oscillatory circuit – колебательный контур
a capacitor – конденсатор
an amplifier – усилитель
a detector – детектор, следящий механизм
a rectifier – выпрямитель, детонатор
the audio frequency – звуковая частота
to couple together – соединять, спаривать
by means of a switch – с помощью переключателя (коммутатора)
means of communication – средства связи
telegraph sending key – телеграфный ключ
dots and dashes – точки и тире
the mirror galvanometer – зеркальный гальванометр
powdered carbon – порошковый углерод
a far sensitive receiver – гораздо более чувствительный приемник
wireless communication – беспроводная связь
a transmitting / receiving coil – передающая / приемная катушка

There are many natural sources of radio waves. But in the later part of the 19th century, scientists figured out how to electronically generate radio waves using electric currents. Two components are required for radio communication: a *transmitter* and a *receiver*.

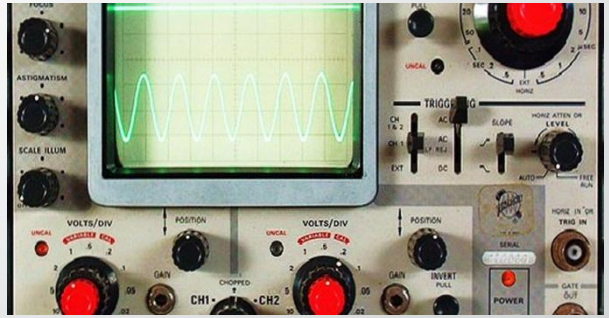

Audio
Signal
Pre
Amplifier
AM
Modulator
Power
Amplifier
Antenna
RF
Oscillator

Radio transmitters

A radio transmitter consists of several elements that *work* together to generate radio waves that contain useful information such as audio, video, or digital data.

Power supply:

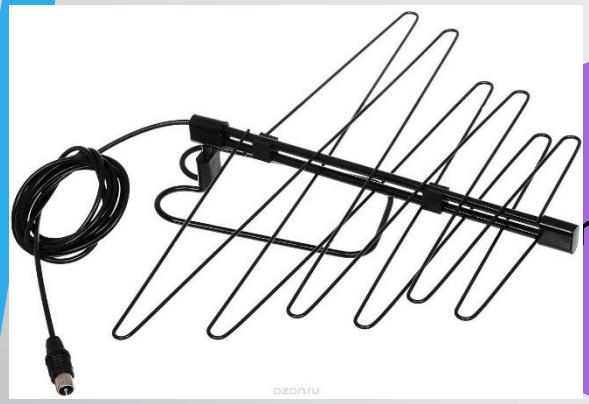
Oscillator:



Modulator

Amplifier:

ntenna::



Power supply:

- Provides the necessary electrical power to operate the transmitter.

Oscillator:

- Creates alternating *current* at the frequency on which the transmitter will transmit. The oscillator usual
  which is referred to as a *carrier wave.*

Modulator:

- Adds useful information to the carrier wave. There are two main ways to add this information. The first
  modulation or AM, makes slight increases or decreases to the intensity of the carrier wave. The second
  modulation or FM, makes slight increases or decreases the frequency of the carrier wave.

Amplifier::

- Amplifies the modulated carrier wave to increase its power. The more powerful the amplifier, the more

Antenna::

- Converts the amplified signal to radio waves.

Radio receivers

A radio receiver is the opposite of a radio transmitter. It uses an antenna to capture radio waves, processes those waves to extract only those waves that are vibrating at the desired frequency, extracts the audio signals that were added to those waves, amplifies the audio signals, and finally plays them on a speaker.

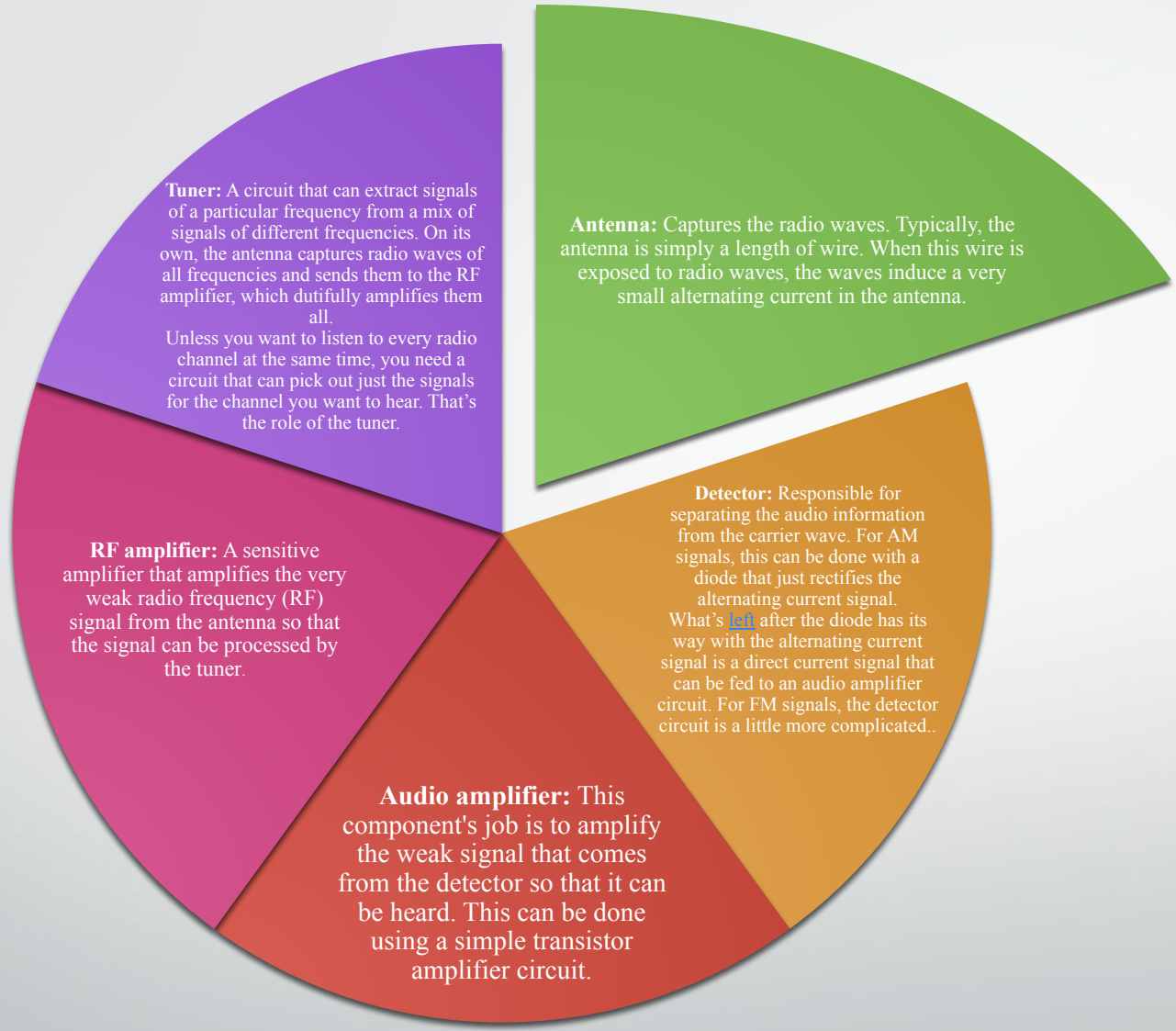
Antenna:

RF amplifier:

Tuner:

Detector:

Audio amplifier:


Tuner: A circuit that can extract signals of a particular frequency from a mix of signals of different frequencies. On its own, the antenna captures radio waves of all frequencies and sends them to the RF amplifier, which dutifully amplifies them all.
Unless you want to listen to every radio channel at the same time, you need a circuit that can pick out just the signals for the channel you want to hear. That's the role of the tuner.
Antenna: Captures the radio waves. Typically, the antenna is simply a length of wire. When this wire is exposed to radio waves, the waves induce a very small alternating current in the antenna.
Detector: Responsible for separating the audio information from the carrier wave. For AM signals, this can be done with a diode that just rectifies the alternating current signal. What's left after the diode has its way with the alternating current signal is a direct current signal that can be fed to an audio amplifier circuit. For FM signals, the detector circuit is a little more complicated..
RF amplifier: A sensitive amplifier that amplifies the very weak radio frequency (RF) signal from the antenna so that the signal can be processed by the tuner.
Audio amplifier: This component's job is to amplify the weak signal that comes from the detector so that it can be heard. This can be done using a simple transistor amplifier circuit.

Of course, there are many variations on this basic radio receiver design. Many receivers include additional filtering and tuning circuits to better lock on to the intended frequency — or to produce better-quality audio output — and exclude other signals. Still, these basic elements are found in most receiver circuits.